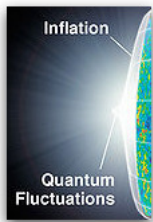




Evolution timeline - Hmolpedia

In timelines, **evolution timeline** shows some of the main intermediates, e.g. quarks, leptons, bosons, [atoms](#), [molecules](#), biomolecules, [bacteria](#) [molecules](#), fish, reptiles, etc., involved in the synthesis or formation of modern [humans](#) ([human molecules](#)) over the last 13.7 billion years of [time](#) of the known [dynamics](#) of the [universe](#) (the symbol E is short for the power of ten, e.g. E2 = 10²):

Picture:

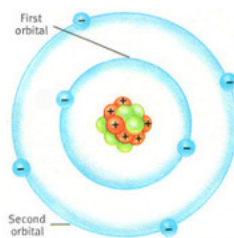
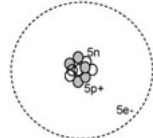
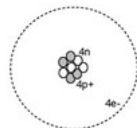
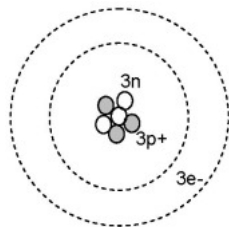
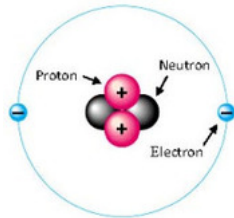
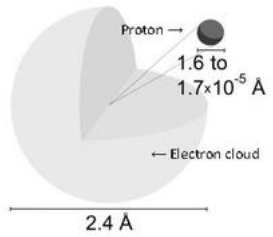
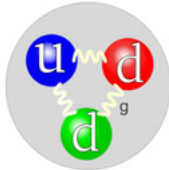
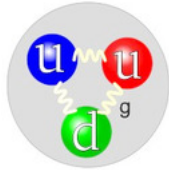


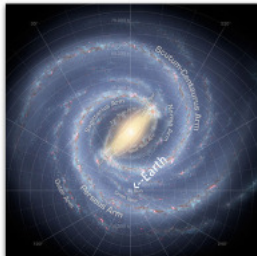
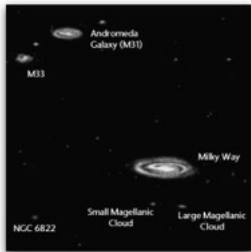
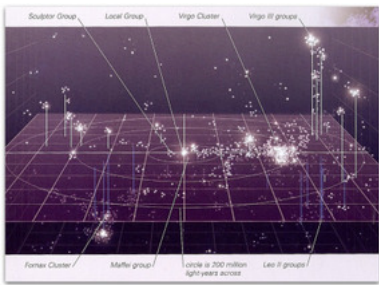
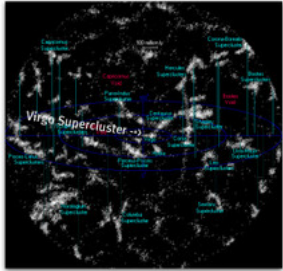
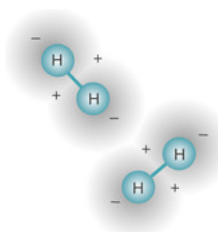
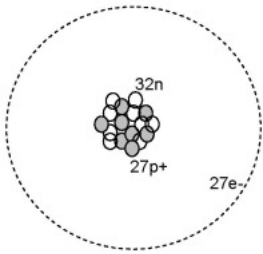
mass→	2.4 MeV	1.27 GeV	171.2 GeV
charge→	$\frac{2}{3}$	$\frac{2}{3}$	$\frac{2}{3}$
spin→	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
name→	u up	c charm	t top
Quarks	4.8 MeV	104 MeV	4.2 GeV
	$-\frac{1}{3}$	$-\frac{1}{3}$	$-\frac{1}{3}$
	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	d down	s strange	b bottom

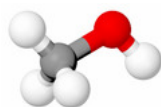
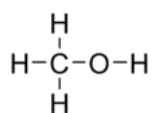
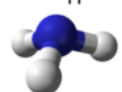
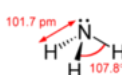
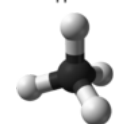
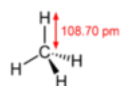
Leptons	<2.2 eV	<0.17 MeV	<15.5 MeV
	0	0	0
	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	ν_e electron neutrino	ν_μ muon neutrino	ν_τ tau neutrino
	0.511 MeV	105.7 MeV	1.777 GeV
	-1	-1	-1
	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$
	e electron	μ muon	τ tau

0 0 1	γ photon	91.2 GeV 0 1	Z weak force
0 0 1	g gluon	80.4 GeV ±1 1	W weak force

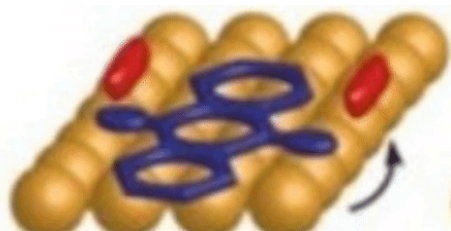
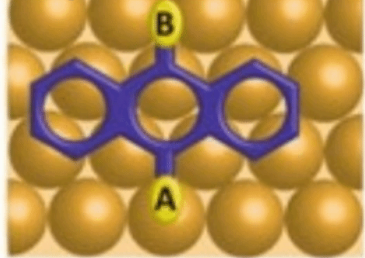
Bosons (Forces)



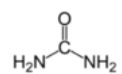


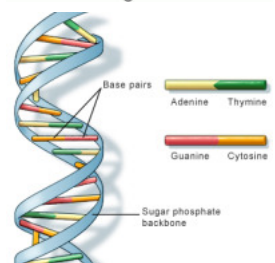
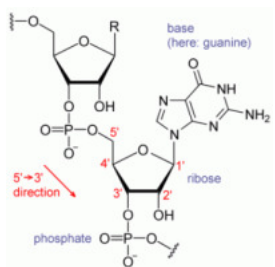
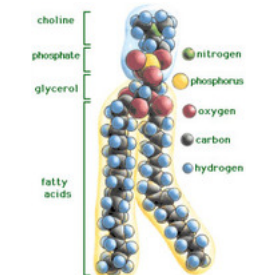
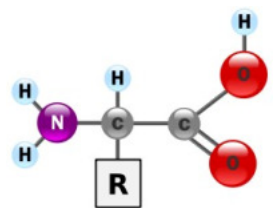
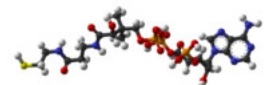
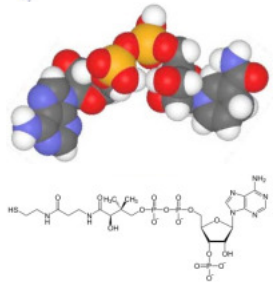
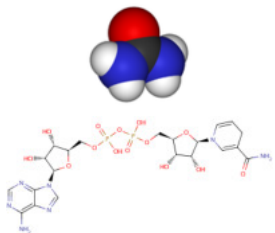


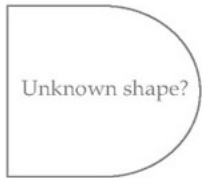
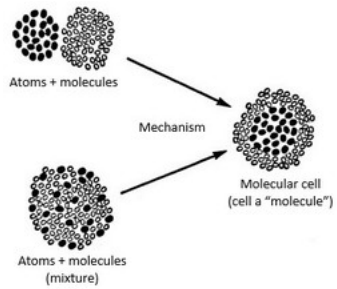
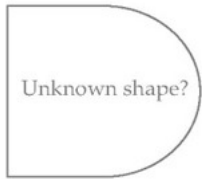
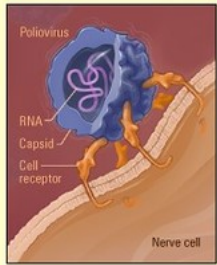
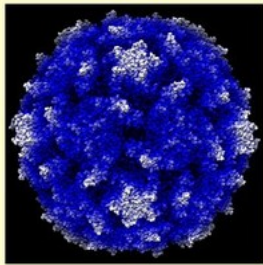
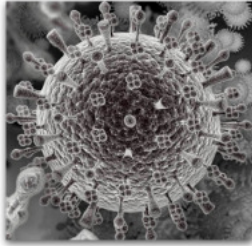
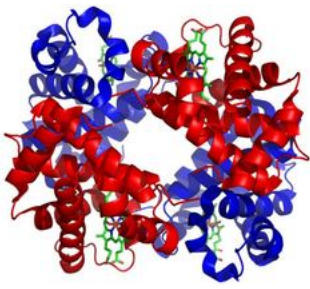
DTA | WALKING MOLECULE

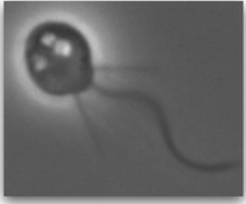


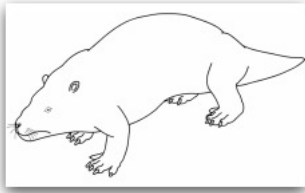
AQ | WALKING & CARRYING MOLECULE



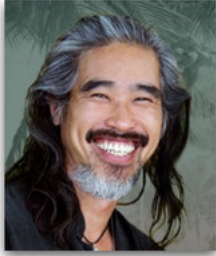


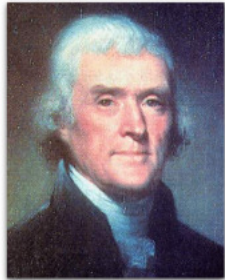


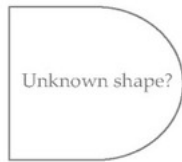
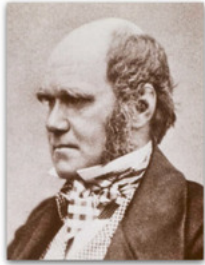












Name:

Before Bang?

Big Bang

Quarks

Leptons

Bosons

Proton

Neutron

Hydrogen

(H-1, H-2, H-3)

Helium

(He-3, He-4)

Lithium

(Li-6, Li-7)

Beryllium, Boron

Carbon to Iron

(stellar nucleosynthesis)

Cobalt to Uranium

(explosive nucleosynthesis)

Hydrogen molecules

Supercluster map

(region of ~50 superclusters)

Virgo Supercluster

(association of ~100 groups/clusters)

Local Group

(a group of ~50 galaxies)

Milky Way

Sun

([sun molecule](#))

Earth

([earth molecule](#))

Water

Methane

Ammonia

Methanol

[DTA](#)

(9,10-DiThioAnthracene)

AQ

(AnthraQuinone)

Urea

NADH

Coenzyme A

Amino acid

Phospholipid

[RNA](#)

[DNA](#)

Myoglobin

[Hemoglobin](#)

[Virus](#)

(avian flu)

Poliovirus

Proto-bacteria A

Proto-bacteria B

(see: [cell-as-molecule](#))

Proto-bacteria C

[Bacteria](#)

(cluster of E. coli)

Coccoid cyanobacteria

(fossil, Australia)

Coccoid cyanobacteria

(fossil, Canada)

Choanoflagellate

Aquatic flatworm

Fish

Walking fish

Amphibian

(first land dwellers)

Reptile

Pangaea

Triconodont

Shrew

Lemur

Old World Monkey

Chimpanzee

Kenyanthropus platyops

Australopithecus afarensis

Homo habilis

Homo erectus

Early human

([human molecule](#))

Y-chromosome man

(DNA tracing, Africa)

Mediterranean

Indian

Asian

Australian

European

(George V)

Siberian
Japenese
Scandinavian
 (Magnus Samuelsson)
Alaskan
 (Eskimo)
North American

South American
Irish
American
 (Thomas Jefferson)
English
 ([Charles Darwin](#))
Man hunting
 ([faces of tomorrow](#))
Evolved human

Formula:

u_2d

d_2u

H

He

Li

Be (4p) - B (5p)

C (6p) - Fe (26p)

Co (27p) - U (92p)

2H₂

He⁵⁷He⁵⁶O⁵⁴Ce⁵³Ne⁵³

Ne⁵³Fe⁵²Si⁵³Mg⁵²Se⁵²

O⁵⁰Fe⁴⁹Si⁴⁹Mg⁴⁹Se⁴⁸Al⁴⁸Ni⁴⁸Ca⁴⁸Cr⁴⁷Na⁴⁶Ke⁴⁶He⁴⁶Ti⁴⁶Fe⁴⁵Ce⁴⁵Pe⁴⁵Mn⁴⁴Sr⁴⁴Ba⁴⁴Cl⁴⁴
 V⁴⁴Li⁴⁴Zr⁴³Rb⁴³Zn⁴⁴Cu⁴³Ne⁴³Be⁴³Ce⁴³Co⁴³Sc⁴³Nd⁴³Ga⁴³Be⁴³La⁴²Nb⁴²Pb⁴²Pr⁴²
 Sm⁴²Th⁴²Gd⁴²Dy⁴²Y⁴²Ge⁴²Ar⁴²Er⁴¹Cs⁴¹Ur⁴¹Hf⁴¹Yb⁴¹Sn⁴¹Eu⁴¹Ta⁴¹As⁴¹Mo⁴¹Ho⁴¹
 W⁴¹Tb⁴¹Br⁴¹Tl⁴⁰Lu⁴⁰Tm⁴⁰He⁴⁰Sb⁴⁰I⁴⁰Cd⁴⁰In⁴⁰Ag⁴⁰Se⁴⁰Hg³⁹Bi³⁹Te³⁹Ru³⁸Pd³⁸
 Au³⁸Pt³⁸Ne³⁸Re³⁸Rh³⁷Os³⁷Kr³⁶Ir³⁵Xe³⁵Ra³⁵Pa³²Ac³⁰At³⁰Po³⁰Rn²⁸Tc²³Pm²³Fr²³

H₂O

CH₄

NH₃

CH₄O

C₁₄H₁₀S₂

["walking molecule"](#)

C₁₄H₈O₂

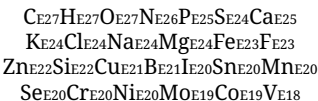
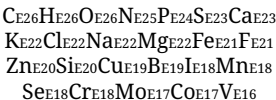
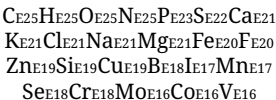
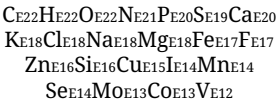
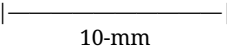
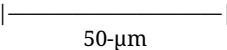
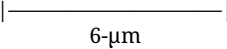
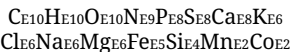
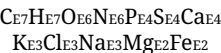
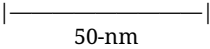
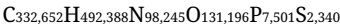
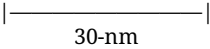
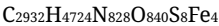
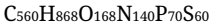
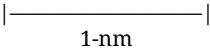
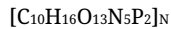
"molecular carrier"

CH₄N₂O

C₂₁H₂₇N₇O₁₄P₂

C₂₁H₃₆N₇O₁₆P₃S

H₂NCHR₂COOH



Date:

**13.7 billion
years ago**

10E-32 seconds after bang

10E-32 seconds after bang

**10E-32 seconds
after bang**

**100 seconds
after bang**

**100 seconds
after bang**

**Minutes
after bang**

**13.5 billion
years ago**

**13.2 billion
years ago**

**4.6 billion
years ago**

**4.5 billion
years ago**

**4.4 billion
years ago**

**4.2 billion
years ago**

3.9 billion years ago

3.5 billion years ago

2.2 billion years ago

900 million years ago

550 million years ago

500 million years ago

400 million years ago

365 million years ago

350 million years ago

250 million years ago

220 million years ago

100 million years ago

45 million years ago

25 million years ago

5.5 million years ago

3.7 million years ago

3.2 million years ago

**2.4 million
years ago**

1.8 million years ago

150,000 years ago

59,000 years ago
(last common ancestor)

55,000 years ago

55,000 years ago

50,000 years ago

40,000 years ago

35,000 years ago

34,000 years ago

32,000 years ago

12,000 years ago

15,000 years ago

12,000 years ago

11,000 years ago

9,000 years ago

330 years ago

1859

Present day

10 years into the future - 7.5 billion years into the future



Talk at the American Society of Chemical Engineers
(Illinois Institute of Technology, 2010)

...trying to argue to engineer [Libb Thums](#) and physicist David Gore, that Planck length particles have [consciousness](#). [8]

The table was compiled using a Google spreadsheet [7] and open materials: [https://doi.org/10.6084/m9.figshare.11462611](#), of course, was the first to speculate, in

[The original spark of [life](#) may have begun in] a warm little pond, with all sorts of ammonia and phosphoric salts, lights, [heat](#), ele

“a 4.4 billion-year-old zircon grain, from a rock in Australia, was found to contain oxygen isotope ratios indicative of water on Earth.”

[Rubin](#) (quote): “One of the great transitions in the history of life: the invasion of land by fish ... for billions of years, all life lived on

can biologist Lynn Marguis, noted for her endosymbiotic hypothesis, gives the best description of what bacterial [sex](#) and reproduction

can geneticist Spencer Wells gives the best overview of "Mitochondrial Eve" of the 1987 mtDNA genetic tracing work of Rebecca

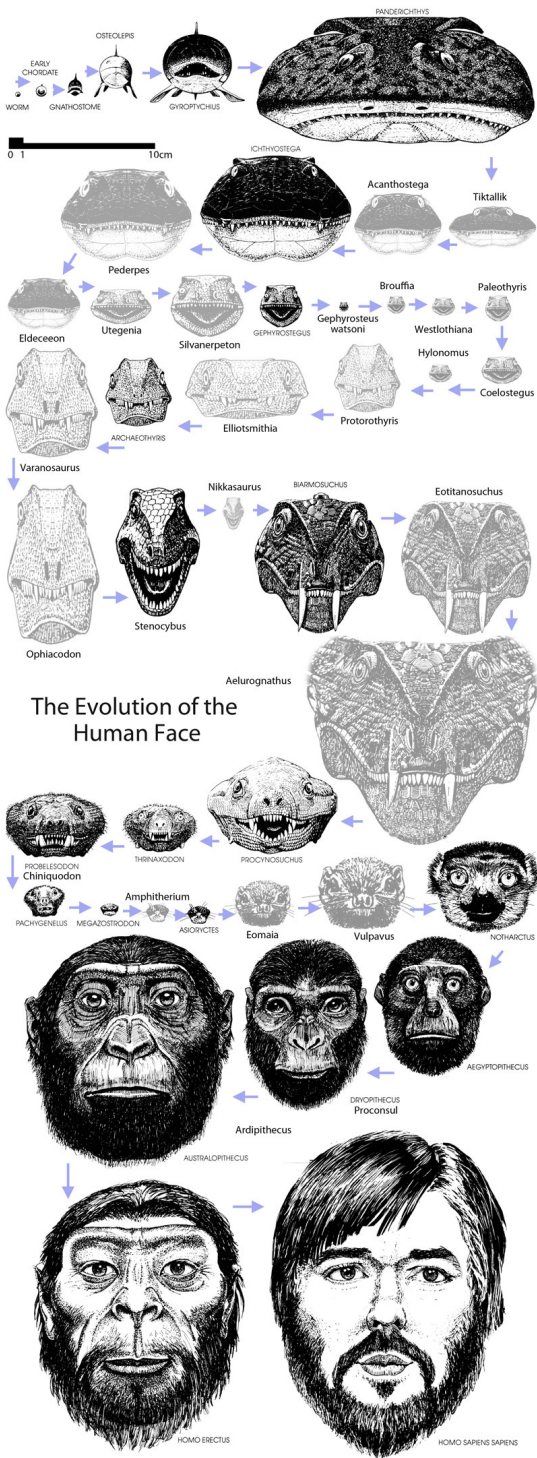
References

1. (a) Thims, Libb. (2007). *Human Chemistry (Volume One)* (preview), (ch. 5: "Molecular Evolution", pgs. 121-146). Morrisville, NC: LuLu.
(g) [Timeline of human evolution](#) – Wikipedia.
(h) [Nucleosynthesis](#) – Wikipedia.
(b) Thims, Libb. (2008). *The Human Molecule* (preview) (docstoc). Morrisville, NC: LuLu.
(i) [Big Bang nucleosynthesis](#) (elements H through Be) – Wikipedia.
(c) Clavin, William H. (2002). *A Brain for all Seasons: Human Evolution and Abrupt Climate Change*. University of Chicago Press.
(j) [Stellar nucleosynthesis](#) (elements B through Fe) – Wikipedia.
(k) [Explosive nucleosynthesis](#) (elements Co through U) – Wikipedia.
(d) Rees, Martin. (2005). *Universe: the Definitive Visual Guide* (Beginning of the universe timeline, pgs. 46-49). Dorling Kindersley.
(l) Haywood, John. (2001). *Atlas of World History* (section: Peopling the Earth: 100,000 - 10,000 Years Ago, pg. 1.02). Barnes & Noble.
(e) Kauffman, Stuart A. (1995). *At Home in the Universe: the Search for the Laws of Self-Organization and Complexity* ([Cyanobacteria fossil pictures](#), pgs. 11-12). Oxford University Press.
(f) Savage, Donald, Wolpert, Stuart, Clark, Cindy, Dybas, Cherly. (2009). "[Life on Earth Began at Least 3.85 Billion Years Ago](#), 400 Million Years Earlier than previously Thought, Scientists Say." NASA, Jun 16.
2. Wells, Spencer. (2002). *The Journey of Man: a Genetic Odyssey* (pgs. 30, 54). Princeton University Press.
3. (a) Margulis, Lynn and Sagan, Dorion. (1995). *What is Life?* University of California Press.
Margulis, Lynn and Sagan, Dorion. (1997). *What is Sex?* Simon & Schuster.
4. source: [The First Spark of Life](#), PDF display, *The Story of Time and Life*, City College of San Francisco, 2009).
5. Shubin, Neil. (2008). *Your Inner Fish: A Journey to the 3.5-Billion-Year History of the Human Body* (pgs. 5-6). Pantheon.
6. Lavoie, Amy. (2009). "[Human Colonization of Australia and the Americas Examined](#)", *Harvard University Gazette Online*, April 23.
7. (a) Bailey, James E. and Ollis, David F. (1986). *Biochemical Engineering Fundamentals* (pg. 4). McGraw-Hill.
(b) Loesy, Ariel G and Siekevitz, Philip. (1969). *Cell Structure and Function* (pg. 35). Holt, Rinehart and Winston, Inc.

8. (a) Erikson, Ted A. (2009). “[What Makes Us Human](#): Panpsychism and Thermodynamics Explored”, In: *Philosophy of Evolution*, in publication (2010).
(b) Talk given to the AIChE students at IIT on April 01, 2010.

Face | Evolution

The following is a circa 2014 face evolution diagram (2), worm to humans, adapted from David Peters’ *From the Beginning: the Story of Human Evolution* (1991), with update missing steps, e.g. [Neil Shubin](#)’s Tiktalik (2006), i.e. “walking fish”, shown in gray, added:



(add discussion)

System of Mammalia | 1790

The following is a 1790 “System of Mammalia” developmental diagram: (2)

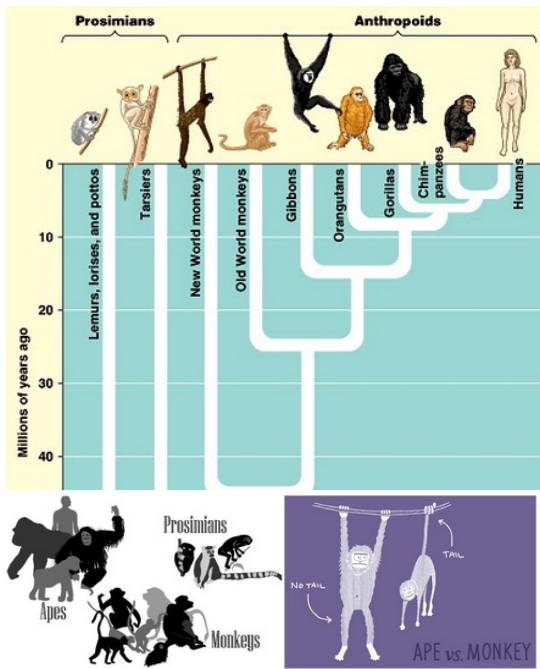






Ape vs Monkey

The following is an “ape vs monkey” diagram, showing that apes are tailless, where has monkeys have tails:

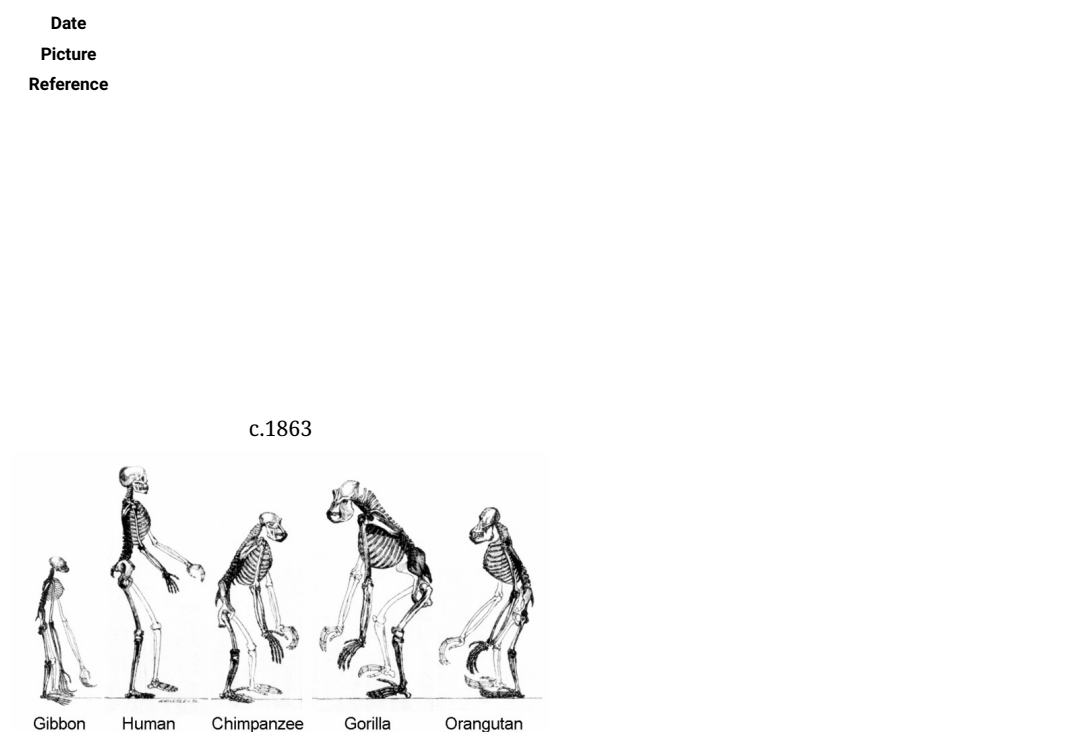


which is a related top in evolution, being that many frequently assert that humans evolved (or didn't evolve) from monkeys, whereas technically humans evolved (or metamorphosized) from apes. The terminological issue becomes mute past a certain point going into the point, in that humans, monkeys, and apes are each types of primates, who evolved from lizards, who evolved from fish, who evolved from worms, who transformed from smaller animate molecules, who where synthesized from the hydrogen atom, which formed from subatomic particles.

Specifically, the earliest hominid species diverged from the ancestor we share with modern African apes, 5 to 8 million years ago.

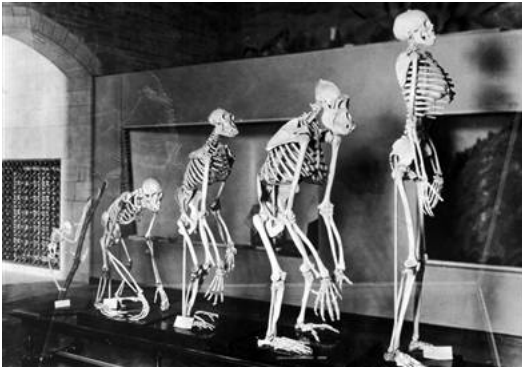
Other timelines

The following are classical and or humors depictions of the evolution of the human from apes and before:



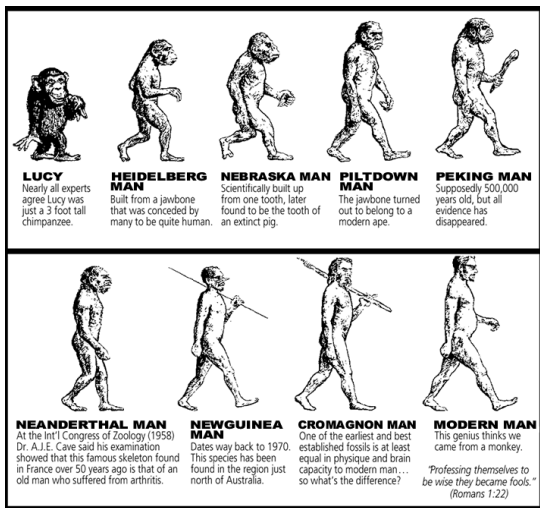
Supposedly from [Thomas Huxley's](#) 1863 *Man's Place in Nature* ([link](#)).

c.1950



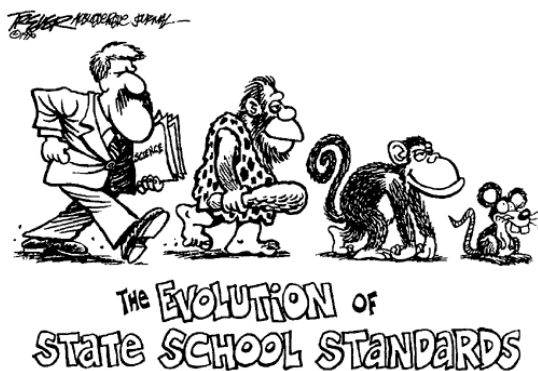
Display: "The Evolution of the Ape to Human" at the Peabody Museum, Yale University ([link](#)).

1986



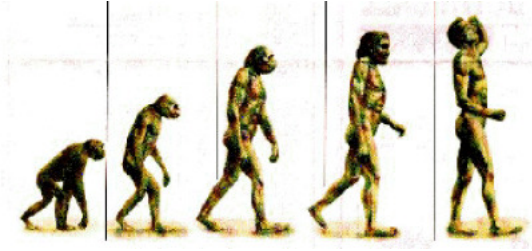
Supposedly from: *The Collapse of Evolution* (1986) by Scott M. Huse, Chick Publications; and used in creation seminars of Kent Hovind.
([link1](#), [link2](#))

1996



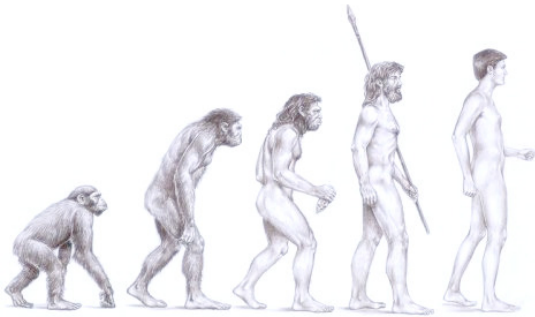
[\(link\)](#)

c.2000

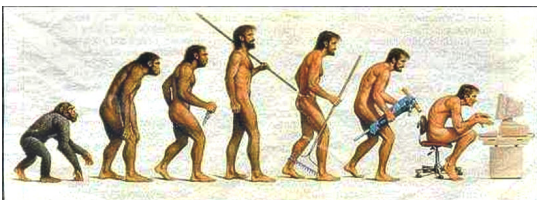


[\(link\)](#)

c.2000



c.2000

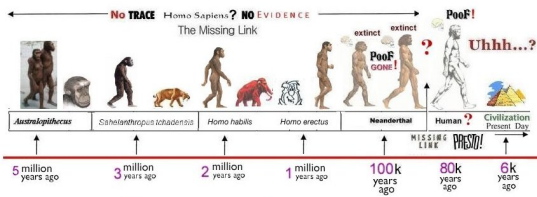


2004



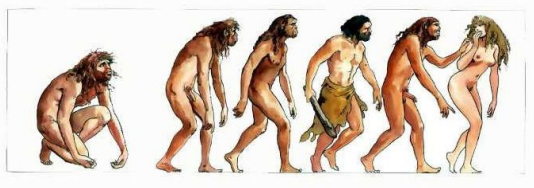
The skeletal evolution of man as seen on the cover of
Jared Diamond's 1991/2004 book *The Third Chimpanzee*.

2006



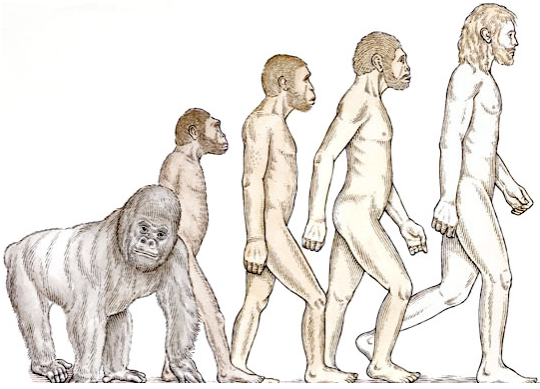
[link](#)

2007



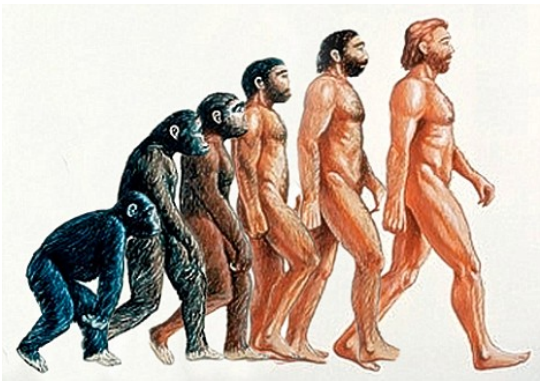
[link](#)

2007



[\(link\)](#)

2008



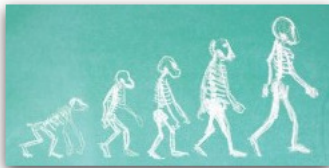
[\(link\)](#)

2008

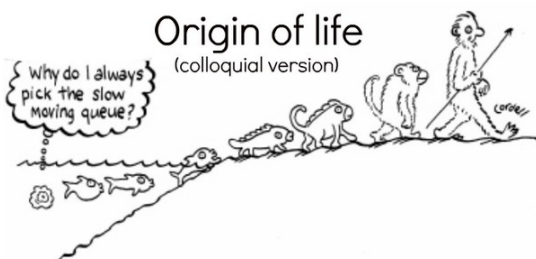


[\(link\)](#)

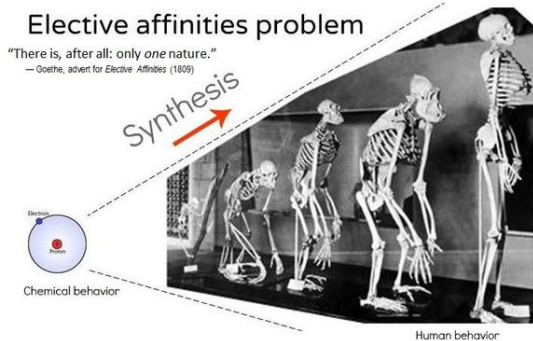
2008



Evolution of woman diagram from Edward Humes
2008 book *Monkey Girl*.



[Origin of life](#)



[Origin of life](#)

See also

? [Chain of being](#)

Further reading

? Weinberg, Steven. (1993). [The First Three Minutes](#): a Modern View of the Origin of the Universe. Basic books.

? Olson, Steve. (2002). *Mapping Human History: Genes, Race, and Our Common Origins*. Houghton Mifflin Company.

External links

? [Timeline of evolution](#) – Wikipedia.

? [List of molecules in interstellar space](#) – Wikipedia.

? [Human ancestry](#) (species profiles and hominid imagery) – ArchaeologyInfo.com.

? Lloyd, Emma. (2008). "[A Human Evolution Timeline](#)", Aug 31, *BrightHub.com*.

θΔics



More pages

Tags

Mobile | [Full Website](#)

loading